NAME: DATE:

# Unit-2 Mastery Assessment (version 609)

**Question 1 (10 points)**

Let $f$ represent a function. If $f[8] = 46$, then there exists a knowable solution to the equation below.

$$y = \frac{f\left[\frac{x+50}{10}\right]}{2} - 12$$

Find the solution.

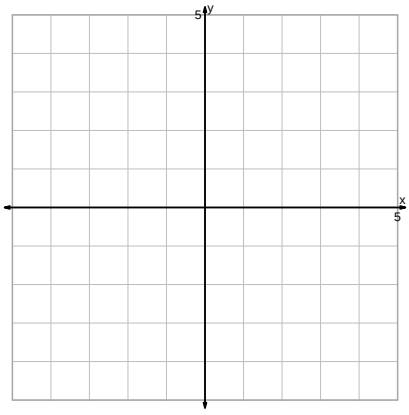
$x =$

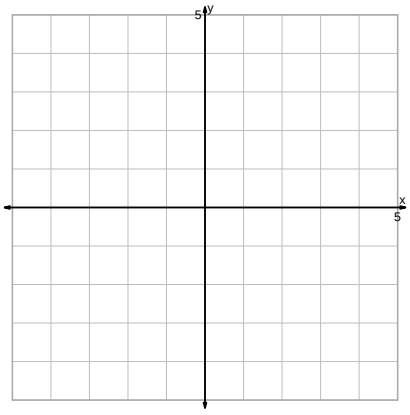
$y =$

**Question 2 (20 points)**

Graph the equations accurately. For each integer-integer point on the parent, indicate the corresponding point precisely. Also, with dashed lines, indicate any asymptotes.

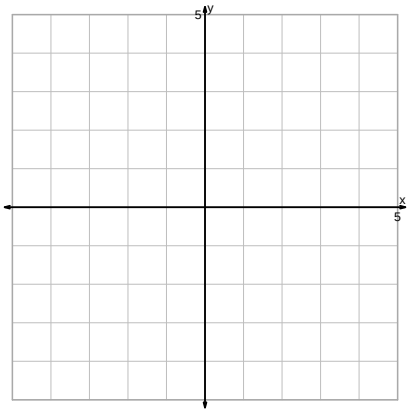
$y = -2^x$

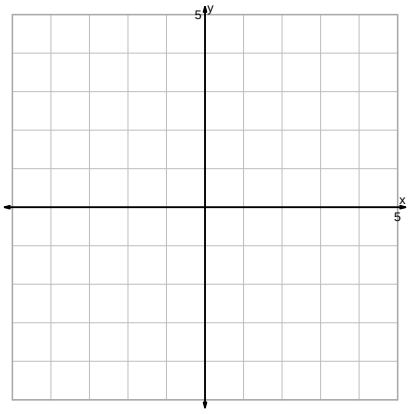



$y = \frac{x^2}{2}$

$y = \sqrt{2x}$

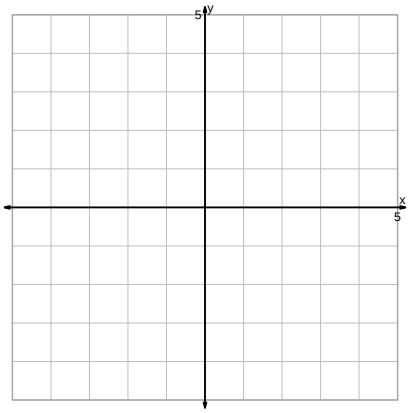


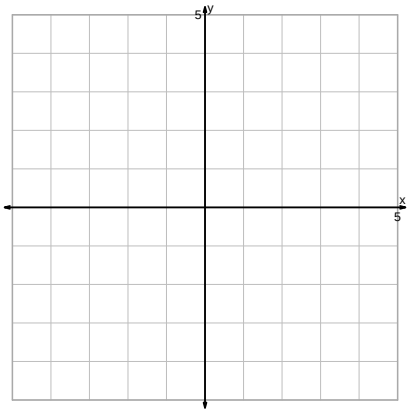




$y = \log_2(-x)$

**Question 2 continued...**

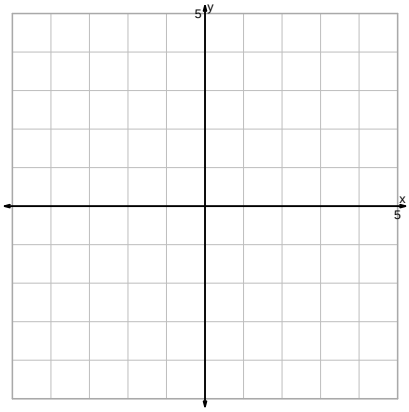
$y = x^3 + 2$

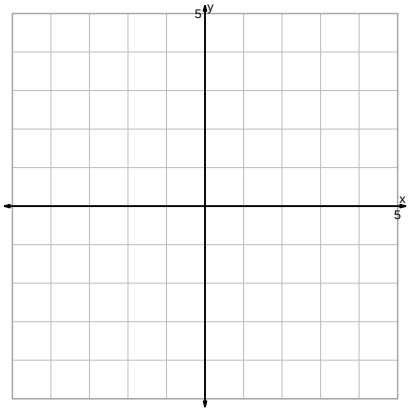



$y = 2 \cdot \sqrt[3]{x}$

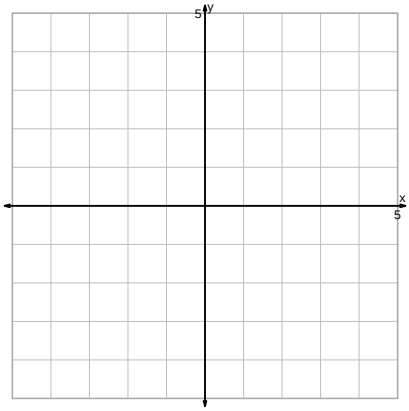
$y = \sqrt[3]{x-2}$

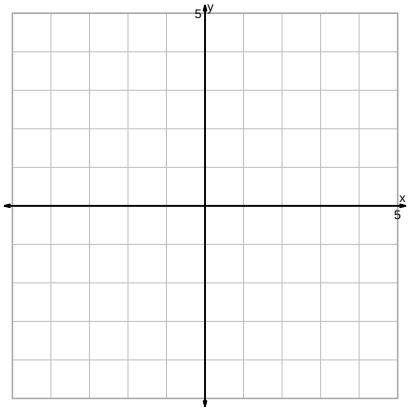



$y = \left(\frac{x}{2}\right)^2$

$y = x^3 - 2$

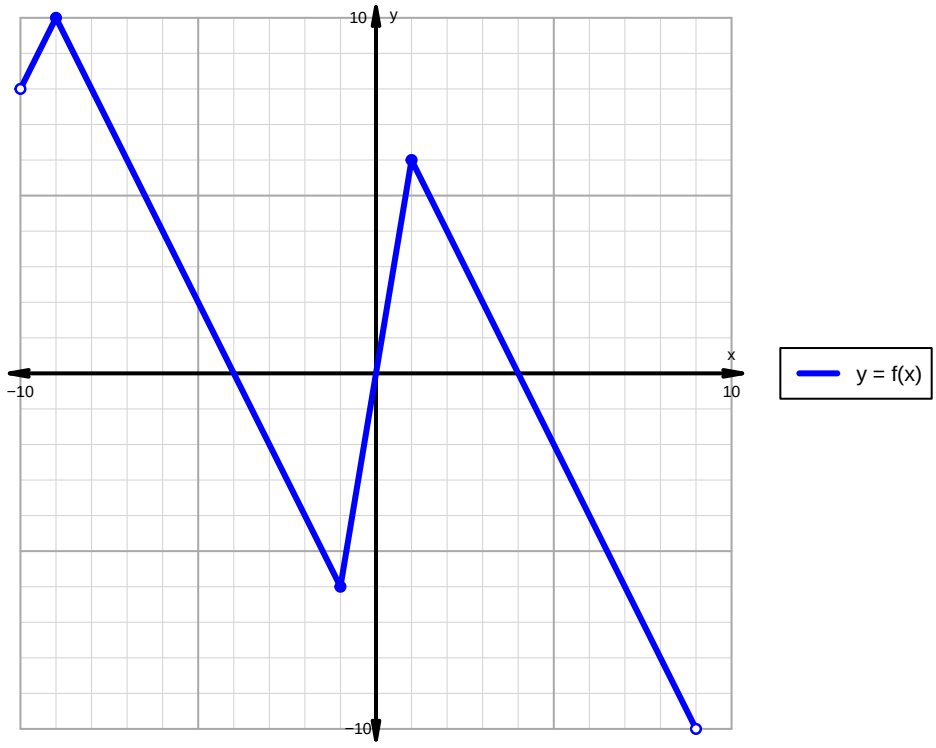



$y = 2^{x+2}$

**Question 3 (20 points)**

A function is graphed below.



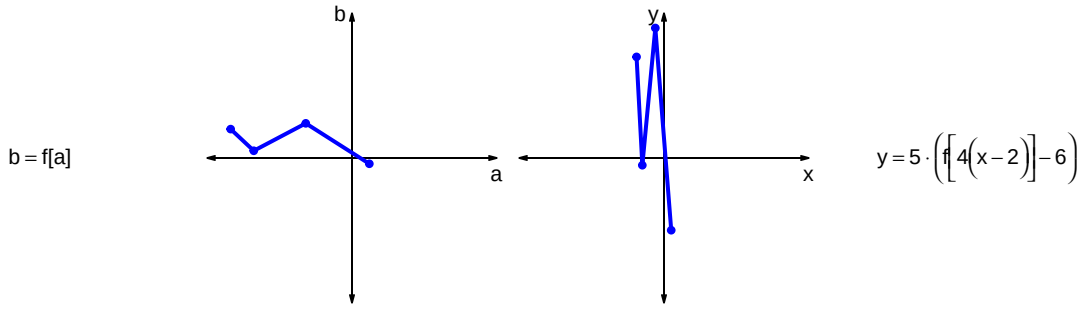

Indicate the following intervals using interval notation.

| Feature | Where |
|---|---|
| Positive | |
| Negative | |
| Increasing | |
| Decreasing | |
| Domain | |
| Range | |

**Question 4 (20 points)**

Let $f$ represent a function. The curves $b = f[a]$ and $y = 5 \cdot (f[4\,(x-2)] - 6)$ are represented below in a table and on graphs.

| a | b | x | y |
|---|---|---|---|
| -84 | 20 | -19 | 70 |
| -68 | 5 | -15 | -5 |
| -32 | 24 | -6 | 90 |
| 12 | -4 | 5 | -50 |




a. Write formulas for calculating $x$ from $a$ and calculating $y$ from $b$. (Or, write the coordinate transformation formula.)

b. What geometric transformations (using words like translation, stretch, and shrink), and in what order, would transform the first curve $y = f[x]$ into the second curve $y = 5 \cdot (f[4\,(x-2)] - 6)$?

**Question 5 (10 points)**

A parent square-root function is transformed in the following ways:

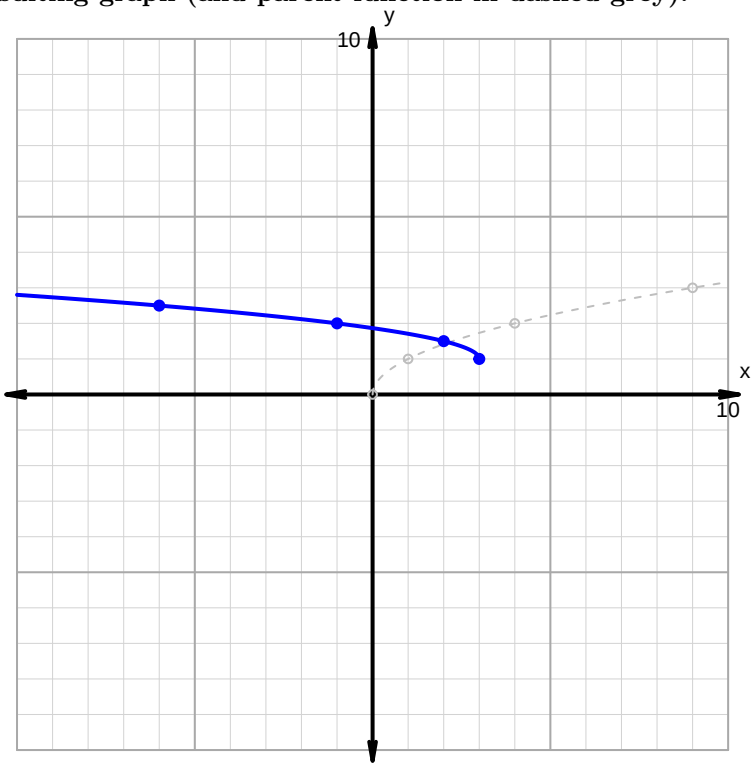
**Horizontal transformations**

1. Translate left by distance 3.
2. Horizontal reflection over $y$ axis.

**Vertical transformations**

1. Vertical shrink by factor 2.
2. Translate up by distance 1.

**Resulting graph (and parent function in dashed grey):**

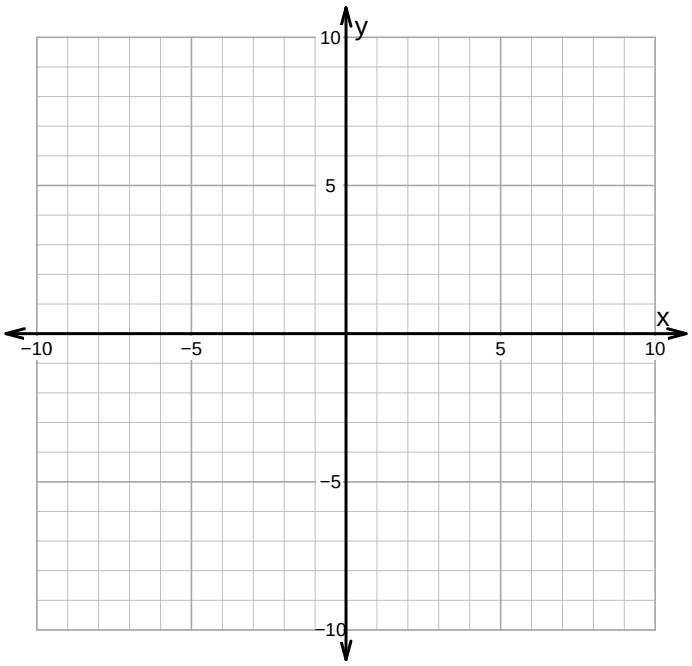



- What is the equation for the curve shown above?

**Question 6 (20 points)**

Make an accurate graph, and describe locations of features.

$$y = \frac{1}{3} \cdot |x + 1| - 2$$




| Feature | Where |
|---|---|
| Domain | |
| Range | |
| Positive | |
| Negative | |
| Increasing | |
| Decreasing | |